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The application geoinformation technologies in logistics

The application of geographic information systems (GIS) and navigational technologies in the problems of logistics is considered, which led to the creation of a new discipline – geologistics. The most effective solution to the problems of reducing costs and improving the quality of the freight transport process is the introduction of GIS to solve the problems of routing, accounting and transport planning. When solving the problems of transport and warehouse logistics, GIS can be considered as a necessary component of the logistics system for managing the work of the transport company, planning of transport, optimization of the location and operation of distributed storage facilities.

The use of geoinformation and navigation technologies in logistics.

Currently, competition is gaining qualitatively new features in the freight market, the consolidation of logistics providers is traced, their territorial expansion is taking place, and the line of proposed services is growing. Against the background of raising the cost of transportation, the rigidity of the requirements for vehicles increased the requirements for the quality of the transportation process. At the same time, there is a tendency to reduce the tariffs for transportation. In such circumstances, reducing transportation costs and, accordingly, improving their efficiency, is a necessary task for the existence and development of logistics companies [1]. The most effective option to solve the problems of reducing costs and improving the quality of the freight process is the introduction of GIS to solve the problems of routing, accounting and planning of transportation.

The use of geoinformation technologies in logistics tasks has led to the creation of a new discipline - geologistics. In solving the problems of transport and warehouse logistics GIS can be considered as a necessary part of the logistics system to manage the work of a motor transport enterprise, planning transportation, optimization of location and work of distributed warehouses. With the using of GIS, you can place on the map of enterprises, warehouses, build optimal routes of traffic of road, railway and other transport, monitor the status of objects in real time, analyze the dynamics of freight flow Different reports. The use of GIS increases the prompt processing of information, the accuracy and timeliness of management decisions, raises the level of service, which generally increases the efficiency of the company and has a positive effect on its competitiveness.

In order to achieve the above tasks of geologistics, it is necessary to optimally solve the tasks of routing goods, to carry out remote control and control of the park of vehicles in real time, to analyze freight flows throughout the territory.

Effective solution of these tasks is impossible without the use of navigation technologies of the global positioning system (GPS). Satellite navigation systems are successfully used not only by drivers, but also in fleet of various scale. The modern development of GPS technology and GSM network has made such a technical solution

to the subject and accessible, and its use in logistics companies is appropriate and quite effective. Not only the location of the vehicles, but also the level of fuel, door opening sensors, volume sensors, etc. can be controlled.

The equipment of vehicles with a satellite navigation system, complete with the GIS dispatching center, allows to raise the efficiency of transport logistics to a qualitatively different level. The tasks of planning routes, staff control, cost calculation are solved. Savings are achieved even as a result of elimination of orientation and location from telephone conversations. The level of automation allows to program automatic alarm signals when the vehicle ascends from the route, violation of the speed mode, exit from the given zone.

Implementation of the satellite monitoring system.

Systems of dispatching and control of moving facilities are intended to ensure prompt control and control of vehicles and to solve safety issues during the transportation of goods, values, passengers.

The system operates as follows: the vehicles are installed onboard equipment, which includes a satellite GPS receiver, navigation-communicative controller, information transmission means. The onboard equipment determines current coordinates, speed, course, gathering information on the status of sensors.

All this is processed in a special way and is transmitted to the dispatching center, where visual control of the location of moving objects on the electronic map of the terrain, their condition (according to sensors) is carried out, and the accumulated information from the database is used to analyze and generate the necessary reports and magazines. Management and control systems differ by methods of determining the coordinates of objects, ways of exchange of information between the dispatching center and objects of control, the structure of GIS. Satellite GPS navigation systems and cellular data transmission channels of GSM 900/1800 are used to monitor and control moving facilities.

The location of the moving object on the computer screen, on the electronic map of the terrain and the state of its sensors in real time is carried out automatically at a given time interval. Depending on the equipment used and the organized communication channel, the dispatcher can control external devices connected to the navigation-communicative controller.

Carriers often suffer losses due to lack of control over the work of personnel, including vehicles. Unreasonable simple, unauthorized flights and other violations of the regulation of vehicles lead to a significant reduction in the economic efficiency of transportation and pose a threat to their safety [2].

The introduction of a GIS monitoring system allows to determine the location of each unit of transport in real time, regardless of weather conditions. GIS can track the route, the time of stay on the road, the presence of passengers, tonnage of loads, etc. The monitoring system also allows to exchange information with vehicles and ensure the safety of their operation.

The use of navigation and geoinformation technologies allows to view on the electronic map all the movement of the vehicle for the selected period of time, the route of its movement and the condition of the connected sensors. On the basis of the information received, reports on the operation of the vehicle for the selected period are

formed: about the total distance traveled, the fuel consumption, the traffic on the route, stopping, speeding and others.

Enterprises that use GIS in combination with satellite monitoring systems significantly increase the efficiency of vehicle park management. Studying the received reports, management has the opportunity to plan and carry out transportation, optimize routes and traffic schedules. By controlling the workload of vehicles during flights and the operation of outbound staff, it is possible to establish more precisely the correspondence between the efficiency of the driver's work and the level of his salary. In addition, the introduction of a monitoring system allows the enterprise to reduce the costs associated with the expectation of fuel and various violations of the working regulation, which certainly brings a significant economic effect.

The software module of transport logistics.

The Typical GIS configuration used to solve logistics problems was presented in [3]. This system, as one of the main components, includes the software module of transport logistics. Consider this component of the GIS logistics company in more detail. Transport logistics software is a comprehensive integrated solution for the planning, management and control of a motor vehicle and cargo transportation based on the planning and accounting program of freight and GPS monitoring system. The module is intended for automation of the operation of dispatching and logistics services of the motor transport enterprise in the field of accounting of orders for freight transportation and efficient distribution of them on the available transport park with optimal cartographic routes. Allows to reduce the costs of the enterprise, increase the efficiency of operation and customer service.

The software module of transport logistics performs the following functions:

- calculation of optimal routes with display on the map of the terrain;
- automatic and manual distribution of orders by cars;
- the possibility of printing route sheets and fragments of a map with a route for each car;
- the possibility of maintaining their own base of clients and partners with attachment to their real location on the map;
- search on the map at the given address, visualization of orders on the electronic card;
- accounting of vehicles;
- creation of car directories;
- the possibility of planning flights from several warehouses;
- possibility of accounting for the time of operation of the client and delivery of cargo;
- accounting of orders;
- keeping a customer database;
- reports on mileage, delivery time, possibility of developing a reporting system and additional functions on individual orders;
- the possibility of developing a reporting system and additional functions on individual orders.

The use of the software module of transport logistics in the GIS logistics company in combination with the use of navigation technologies allows:

- improving the efficiency of distribution of orders on the available transport park;
- optimization of traffic routes due to the construction of optimal cartographic routes;
- automation of preparation of route sheets of the fleet;
- reducing the cost of fuel and lubricants;
- reduction of delivery time;
- optimal loading of vehicles;
- control of cargo transportation in real time using the GPS monitoring system.

Conclusions

The use of geoinformation technologies in logistics tasks has led to the creation of a new discipline - geologistics. In solving the problems of transport and warehouse logistics GIS can be considered as a necessary part of the logistics system to manage the work of a motor transport enterprise, planning transportation, optimization of location and work of distributed warehouses. With the help of GIS it is possible to place on the map of enterprises, warehouses, to build optimal routes of traffic, to monitor the condition of objects in real time, to analyze the dynamics of cargo flows. Effective solution of these tasks is impossible without the use of navigation technologies of satellite monitoring of transport.

References

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